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मानक

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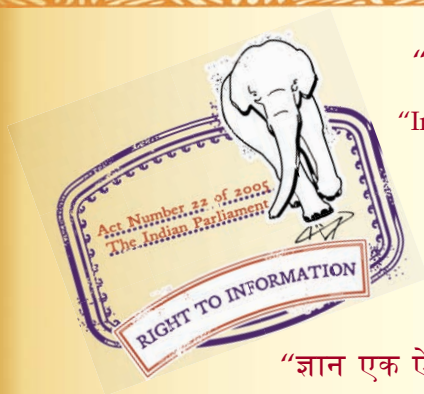
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“पुराने को छोड़ नये के तरफ”

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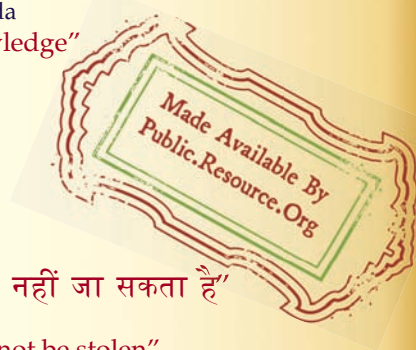
IS 13798 (1993): Polyurethane Base Knifing Filler (Two Pack) for Exterior Painting of Railway Coaches [CHD 20: Paints, Varnishes and Related Products]



“ज्ञान से एक नये भारत का निर्माण”

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“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS 13798 : 1993
(Reaffirmed 2009)

भारतीय मानक

**रेल डिब्बों की बाहरी सतह पर रंग रोगन करने के लिए
पालियूरेथेन बेस नाइफिंग — विशिष्ट**

Indian Standard

**POLYURETHANE BASE KNIFING FILLER
(TWO PACK) FOR EXTERIOR PAINTING OF
RAILWAY COACHES — SPECIFICATION**

UDC 667.622.51 : 667.621.633 : 678.664 : 625.2

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1993

Price Group 3

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Industrial Paints Sectional Committee had been approved by the Chemical Division Council.

High performance coatings based on synthetic polymers are a recent development. Polyurethane coating systems being the most recent addition, are probably the best available system for corrosion protection of steel. It is also the economical among other anti-corrosion coatings. It not only wards off corrosion but also fortifies the steel against chemical attack and physical damage.

The use of polyurethane paints presents a two-fold potential hazard such as toxic and fire hazards. The safety precautions must be taken in handling and painting of these materials (*see* Annex F).

The committee responsible for preparation of this standard is given in Annex G.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 2 NOVEMBER 2004
TO
IS 13798 : 1993 KNIFING FILLER
(TWO PACK) FOR POLYURETHANE SYSTEM —
SPECIFICATION

(*First cover page, Hindi title, read with Amendment No. 1*) — Substitute
the following for the existing Hindi title:

**‘पालियूरेथेन पद्धति के लिए
नाइफिंग फिलर(दो पैक)-विशिष्ट’**

(CHD 20)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 1 SEPTEMBER 2000
TO
IS 13798 : 1993 POLYURETHANE BASE: KNIFING
FILLER (TWO PACK) FOR EXTERIOR PAINTING OF
RAILWAY COACHES — SPECIFICATION

(*Title, cover page*) — Substitute the following for the existing title and wherever it appears subsequently:

KNIFING FILLER (TWO PACK) FOR POLYURETHANE
SYSTEM — SPECIFICATION'

(*Page 1, clause 4.1.1*) — Substitute the following for the existing:

'Knifing filler shall be either Type A, consisting of appropriate polyester resin or Type B, consisting of appropriate unsaturated polyol. In addition to these, knifing filler of both types shall also contain pigments, extenders, solvents and additives.'

(*Page 7, Table 1*) — Substitute the following for the existing table:

Amend No. 1 to IS 13798 : 1993

Table 1 Requirements for Knifing Filler (Two Pack)
for Polyurethane System

Sl No.	Characteristic	Requirement		Methods of Test	
		Type A	Type B	Annex	Ref to Part/ Section of IS 101
(1)	(2)	(3)	(4)	(5)	(6)
i)	Drying time:				
	a) Surface dry, <i>Max</i>	30 minutes	2 h	—	Part3/ Sec 1
	b) Hard dry, <i>Max</i>	6 h	18 h	—	—
	c) Hard dry, 70°C	2 h with 15 minutes flash off time	2 h with 15 minutes flash off time	—	
ii)	Consistency	Smooth and uniform and suitable for knife application	Smooth and uniform and suitable for knife application	—	Part 1/ sec 5
iii)	stopping properties	Shall show no sagging, cracking or shrinkage	Shall show no sagging, cracking or shrinkage	B	—
iv)	Rubbing properties	Shall dry rub with 180 grade paper and wet rub with 280 grade water proof paper without clogging of the paper and shall not show defects like roughness, scratches, cracks and pinhole after rubbing	Shall dry rub with 180 grade paper and wet rub with 280 grade water proof . paper without cloggttlg of the paper and shall not show defects like roughness, scratches, cracks and pinhole after rubbing	C	
v)	Hold out adhesion and compatibility in paint system	Finish with uniform gloss and colour with good adhesion and compatibility of the system	Finish with uniform gloss and colour with good adhesion and compatibility of the system	D	—
vi)	Pot life, <i>Min</i>	30 minutes	30 minutes	E	—
vii)	Keeping properties	Not less than six months	Not less than six months	—	Part 6/ Sec 2

(CHD31)

Reprography Unit, BIS, New Delhi, India

Indian Standard

**POLYURETHANE BASE KNIFING FILLER
(TWO PACK) FOR EXTERIOR PAINTING OF
RAILWAY COACHES — SPECIFICATION**

1 SCOPE

1.1 This standard prescribes requirements and methods of sampling and test of a two-pack, unsaturated polyester base or polyurethane base knifing filler intended to be used for the protection of steel like exteriors or railway coaches, diesel and electrical locomotives against atmospheric corrosion. It is suitable for application by knife of about 30 cm width or more.

1.1.1 The material is intended to be used for levelling up effectively the surface imperfections such as dents and depressions less than 10 mm on the exteriors of railway coaches. The material shall have good compatibility with polyurethane primer on which it is to be applied with polyurethane surfacer which is used as a subsequent coat.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 1303 : 1983 shall apply.

4 REQUIREMENTS

4.1 Composition

The knifing filler shall consist essentially of two components, knifing filler and hardener or catalyst solution. The mixing ratio shall be as recommended by the supplier.

4.1.1 Knifing filler shall consist of i) either an appropriate unsaturated polyester resin or polyol, and ii) pigments, extenders, solvents and additives.

4.1.2 Hardener or catalyst solution shall consist of i) either an organic peroxide or a polyisocyanate, and ii) solvents and additives.

4.2 The material shall also comply with the requirements given in Table 1.

5 TESTS

5.1 Unless specified otherwise, tests shall be conducted as prescribed in IS 101. References to the relevant parts and sections of that standard are given in column 5 of Table 1.

**Table 1 Requirements for Polyurethane Base Knifing
Filler (Two-Pack)**
(Clauses 4.2 and 5.1)

Sl No.	Characteristic	Requirement	Methods of Test	
			Annex	Ref to Part/ Section of IS 101 (5)
(1)	(2)	(3)	(4)	
i)	Drying time			Part 3/Sec 5 : 1987
	a) Surface dry, <i>Max</i>	30 min		
	b) Hard dry, <i>Max</i>	6 h		
	c) Hard dry, 70°C <i>Max</i>	2 h with 15 min flash off time		
ii)	Consistency	Smooth and uniform and suitable for knife application	—	Part 1/Sec5 : 1989
iii)	Stopping properties	Shall show no sagging, cracking or shrinkage	B	—
iv)	Rubbing properties	Shall dry rub with 180 grade paper and wet rub with 280 grade water proof paper without clogging of the paper and shall not show defects like roughness, scratches, cracks and pinholes after rubbing	C	—
v)	Hold out adhesion and compatibility in paint system	Finish with uniform gloss and colour with good adhesion and compatibility of the system	D	—
vi)	Pot life, <i>Min</i>	30 minutes	E	—
vii)	Keeping propertie	Not less than 6 months	—	Part 6/Sec 2 : 1989

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5.2 The preparation of metal panels shall be as per IS 101 (Part 1/Sec 3) : 1986.

5.3 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070 : 1992) shall be employed.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

5.4 The two component knifing filler shall be mixed in the ratio recommended by the manufacturer before carrying out the tests.

6 PACKING AND MARKING

6.1 Packing

Unless otherwise agreed to between the purchaser and the supplier, the material shall be packed in metal containers conforming to IS 1407 : 1980 and IS 2552 : 1989.

6.1.1 Each component as delivered shall be free of gel, coarse particles, skins, foreign matter and sediments. Any sediment that does form must be easy to stir up again with power/mechanical stirrer in order to give a homogeneous paint. However, rise in temperature shall not be more than 5°C.

6.2 Marking

Each container shall be marked with the following:

- a) Name of the material with component's name;
- b) Indication of the source of manufacture;
- c) Volume of the material;
- d) Month and year of manufacture;
- e) Mixing proportion recommended for use; and
- f) Other instructions for safety handling and use of the material.

7 SAMPLING

7.1 Representative samples of the material shall be drawn as per 6 of IS 101 (Part 1/Sec 1) : 1986.

7.2 Criteria for Conformity

7.2.1 Drying time shall be tested on at least 2 samples taken from 2 different containers selected as per 7.1, for lot size above 1 000 kg this shall be minimum 3. For the rest of the characteristics, tests shall be conducted on one composite sample prepared from individual samples taken from different containers in the sample.

7.2.2 There shall be no failure in respect of any test if the lot is to be considered conforming to the requirements of this specification.

ANNEX A
(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
101(Part 1/ Sec 1) : 1986	Methods of sampling and tests for paints, varnishes and related products : Part 1 Tests on liquid paints (general and physical), Sec 1 Sampling (<i>third revision</i>)	101(Part5/ Sec 1) : 1988	Part 5 Mechanical tests on paint films, Sec 1 Hardness test (<i>third revision</i>)
Sec 3) : 1986	Sec 3 Preparation of panels (<i>third revision</i>)	Sec 2): 1988	Sec 2 Flexibility and adhesion (<i>third revision</i>)
Sec 5) : 1989	Sec 5 Consistency (<i>third revision</i>)	101 (Part 6/ Sec 1) : 1988	Part 6 Durability tests on paint films, Sec 1 Durability under conditions of condensation (<i>third revision</i>)
Sec 6) : 1987	Sec 6 Flash point (<i>third revision</i>)	Sec 2) : 1989	Sec 2 Keeping properties (<i>third revision</i>)
Sec 7) : 1986	Sec 7 Mass per ten litres (<i>third revision</i>)	101 (Part 8/ Sec 6) : 1993	Part 8 Tests for pigments and other solids, Sec 6 Volume solids
101(Part 3/ Sec 4) : 1987	Methods of sampling and tests for paints, varnishes and related products : Part 3 Tests on paint film formation, Sec 4 Finish (<i>third revision</i>)	1070 : 1992	Reagent grade water (<i>third revision</i>)
Sec 5) : 1987	Sec 5 Fineness of grind (<i>third revision</i>)	1303 : 1983	Glossary of terms relating to paints (<i>second revision</i>)
101 (Part 4/ Sec 2) : 1989	Part 4 Optical tests on paint films, Sec 2 Colour (<i>third revision</i>)	1407 : 1980	Round paint tins (<i>second revision</i>)
		1745 : 1978	Petroleum hydrocarbon solvents (<i>second revision</i>)
		2552:1989	Steel drums (galvanized and ungalvanized) (<i>third revision</i>)

ANNEX B

(Table 1, Sl No. iii)

DETERMINATION OF STOPPING PROPERTIES

B-1 GENERAL

B-1.1 A mild steel panel is dented with a specified number of dents and then coated with knifing filler. It is then examined for satisfactory stopping properties.

B-2 PROCEDURE

B-2-1 Dent a 300 mm × 150 mm × 0.900 mm mild steel panel with blunt iron ball hammer with 10 dents of about 3 mm diameter and 1 mm deep. The dents shall be approximately 50 mm from the sides of the panel

and approximately 50 mm apart from one another. Roughen the panel with emery paper No. 180. Wipe this with petroleum hydrocarbon solvent, 145/205 (low aromatic) (see IS 1745 : 1978) and allow to dry. Make three coats of the knifing filler with an interval of 6 hours, each application having an average dry film thickness of 0.3 mm. Keep the panel vertical.

B-2.2 The material shall be deemed to have passed the test if there is no sagging after 2 hours of the application at the dents, it works hard in 6 hours and shows no signs of crack or shrinkage after 18 hours.

ANNEX C

(Table 1, Sl No. iv)

DETERMINATION OF RUBBING PROPERTIES

C-1 GENERAL

C-1.1 The material in a specified film thickness is applied on a mild steel panel. The film when dry is tested for its rubbing properties by rubbing with abrasive paper.

C-2 PROCEDURE

C-2.1 Take a metal panel of size 150 mm × 150 mm × 1.25 mm. Roughen the panel with emery paper No. 180. Wipe with petroleum hydrocarbon solvent, 145/205 (see IS 1745 : 1978) and allow to dry. Make one

application of the knifing filler, with a thickness of 0.5 to 0.8 mm. Allow it to dry for 6 hours.

C-2.2 The film prepared shall be subjected to dry rubbing with 180 grade paper, and wet rubbing with 280 grade water proof abrasive paper without any clogging of the paper.

C-2.3 The material shall be deemed to have passed if the surface shall not show defects like roughness, scratches, cracks, pinholes, etc.

NOTE — Minute pin holes or scratches which will duly be filled by the subsequent coat of filler, shall not be the cause for rejection.

ANNEX D

(Table 1, Sl No. v)

DETERMINATION OF HOLD-OUT, ADHESION AND COMPATIBILITY IN PAINT

D-1 GENERAL

D-1.1 The material is tested in a painting system and schedule simulating actual use. Uniformity of colour and gloss along with satisfactory adhesion between coats is taken as criteria for the material having passed the test.

D-2 PROCEDURE

D-2.1 A paint system shall be prepared as follows.

D-2.1.1 Clean the surface either by shot or grit blast, by phosphating or by any appropriate chemical treatment. Apply one coat of polyurethane primer zinc chrome

(two-pack) minimum 35 microns, and allow to dry for at least 6 hours but not more than 24 hours. Dry rub with emery paper No. 400 and wipe clean with a dry soft cloth.

D-2.1.2 Give 3 applications of the knifing filler as in **B-2.1** The overall dry film thickness of three applications shall be about 1 mm. Allow the final coat to dry for 6 hours but not more than 24 hours. Wet rub with 280 grade waterproof abrasive paper and allow to dry.

D-2.1.3 Spray one coat of polyurethane surfacer (two-pack) at minimum 35 microns and allow to dry for at

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least 6 hours but not more than 24 hours. Wet rub with waterproof emery No. 400 and allow to dry.

D-2.1.4 Spray one coat of full gloss polyurethane enamel (two-pack) at minimum 35 microns and allow to dry

for at least 12 hours before assessing the performance.

D-2.2 The material shall be deemed to have passed the test if the resultant finish is uniform in gloss and colour.

ANNEX E
(Table 1, Sl No. vi)

DETERMINATION OF POT LIFE

E-1 GENERAL

E-1.1 The time taken to double the viscosity from the original value shall be considered as the pot life of the material.

E-2 PROCEDURE

E-2.1 Thoroughly mix component parts in the ratio

specified by the paint manufacturer to give a sample of 200 ml by volume.

E-2.2 Within 10 minutes of mixing (**E-2.1**) determine the viscosity as prescribed in IS 101(Part 1/Section 5) : 1989.

E-2.3 Allow the mixed sample of paint to stand in a suitable air-tight container and determine the viscosity at the end of the specified time.

ANNEX F
(Foreword)

HEALTH HAZARDS AND SAFETY MEASURES

Use of polyurethane paints generally presents a two-fold potential hazard, toxic hazards and fire hazards.

Toxic effects through the lungs and the skin occur frequently in the industrial usage of paints. The best guide of comparative values of ingestion toxicity is the LD 50 value. It refers to the lethal doses of toxic substance which can kill 50 percent of one class of animal in test. The LD 50 value for polyisocyanates is much lower when compared to the LD 50 value of cyanides. Another guide of comparative values of inhalation is the threshold limit value (TLV). The TLV for monomelic di-isocyanates has been fixed up at 0.02 ppm. Therefore, spraying of polyurethane paints

calls for safety precautions in the form of proper ventilation, proper exhaust facilities and hand-gloves for the spray painters. However, it would be an ideal painting practice to go in for proper spray booth.

As far as fire hazards are concerned, all solvents based paints are known for their fire-risks. This can be eliminated by providing good ventilation so as to avoid vapour air mixture which are flammable and also by not exposing the paint vapours to sources of static electricity, sparks or flames.

The polyurethane coatings are as safe to handle as any other solvent based paints, provided general industrial hygiene principles are followed.

ANNEX G
(Foreword)
COMMITTEE COMPOSITION

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